1. Evaluate.

(a) $6 + (-3)$

(b) $(-12) + (-11)$

(c) $15 + (-18)$

(d) $12 - (-13)$

(e) $-17 - 7$

(f) $(-23) + 9 - (-4)$

(g) $(-3) + (-16) - 10$

2. Evaluate.

(a) $(-11) \times (-5)$

(b) $(-6) \times 7$

(c) $(-3)(5)(-4)$

(d) $(-6)(7)(8)(-2)$

(e) $35 \div (-5)$

(f) $(-72) \div (-9)$

(g) $132 \div 12$

(h) $(8)(-4) \div (-2)$

(i) $(5)(-9) \div (-3)(7)$

(j) $56 \div (8)(7) \div 49$

3. Evaluate.

(a) $-12 \div (-3) + (-3)$

(b) $(-3)^2 - (-2)^2$

(c) $(-5)^2 - (-7) + (-12)$

(d) $-4 + 20 \div (-4)$

(e) $-3(-4) + 8^2$

(f) $(-16) - ((-8) \div 2)$

4. Evaluate.

(a) $\dfrac{-12 - 3}{-3 - 2}$

(b) $\dfrac{-18 + 6}{(-3)(-4)}$

(c) $\dfrac{(-16 + 4) \div 2}{8 \div (-8) + 4}$

(d) $\dfrac{-5 + (-3)(-6)}{(-2)^2 + (-3)^2}$

(e) $-9 - 3[2(2 - 3)]$

(f) $-4[(-3)(-2) + 4]$

(g) $160 \div (-4) + 2[3(8 - 4)]$

5. Evaluate.

(a) $\frac{1}{4} + \frac{-3}{4}$

(b) $\frac{1}{2} - \frac{-2}{3}$

(c) $\frac{-3}{4} - \frac{1}{-4}$

(d) $\frac{-3}{5} + \frac{3}{-4}$

(e) $\frac{-1}{4} - 1\frac{1}{3}$

(f) $-8\frac{1}{4} - \frac{-1}{-3}$

(g) $\frac{2}{-3} - 1\frac{5}{6}$

(h) $\frac{5}{-6} - 2\frac{1}{3}$

(i) $\frac{-3}{5} + \frac{-3}{4} - \frac{7}{10}$

(j) $\frac{2}{3} - \frac{-1}{2} - \frac{1}{-6}$

6. Evaluate.

(a) $\frac{4}{5} \times \frac{-20}{25}$

(b) $\frac{3}{-2} \times \frac{6}{5}$

(c) $\left(\frac{-1}{3}\right)\left(\frac{2}{-5}\right)$

(d) $\left(\frac{9}{4}\right)\left(\frac{-2}{-3}\right)$

(e) $\left(\frac{1}{-2}\right)\left(\frac{-2}{5}\right)$

(f) $\frac{-4}{5} \times \frac{10}{-4}$

(g) $\left(\frac{-5}{12}\right)(-24)$

(h) $\left(-2\frac{1}{4}\right)\left(\frac{2}{-9}\right)$

(i) $\left(-1\frac{1}{10}\right)\left(3\frac{1}{11}\right)$

(j) $-4\frac{1}{6} \times -7\frac{3}{4}$

7. Evaluate.

(a) $\frac{-4}{3} \div \frac{2}{-3}$

(b) $-7\frac{1}{8} \div \frac{3}{2}$

(c) $\frac{-2}{3} \div \frac{-3}{8}$

(d) $\frac{-3}{-2} \div \left(\frac{-1}{3}\right)$

(e) $-6 \div \left(\frac{-4}{5}\right)$

(f) $\left(-2\frac{1}{3}\right) \div \left(-3\frac{1}{2}\right)$

(g) $\left(-2\frac{1}{2}\right) \div \left(\frac{-1}{2}\right)$

(h) $\left(-\frac{-2}{3}\right) \div \left(-1\frac{1}{5}\right)$

(i) $\left(-3\frac{1}{4}\right) \div \left(-2\frac{3}{4}\right)$

(j) $\left(-1\frac{5}{8}\right) \div 13$

8. Find the value of each expression for $x = -5$ and $y = -4$.

(a) $-x + 2y$

(b) $-4x - 2y$

(c) $3x^2 - 5y$

(d) $-3x - 2y^2$

(e) $y^2 - 3x^2$

(f) $2xy - y^3$

(g) $5xy - 3x + 4y$

(h) $(3x - 4y)^2$

(i) $(3x)^3 + (2y)^2$

(j) $\left(\frac{x}{y}\right) - \left(\frac{y}{x}\right)$

9. If $a = -\frac{1}{2}$ and $b = \frac{2}{3}$, find the value of each expression.

(a) $x + y$

(b) $x - y$

(c) $x + 2y$

(d) $3x - 2y$

(e) $\frac{1}{2}x - \frac{1}{2}y$

10. Simplify each expression using $a = \frac{1}{3}$, $b = \frac{1}{2}$, and $c = -\frac{1}{8}$.

(a) $ab + c$

(b) $2a - 4b + c$

(c) $c(a + b)$

(d) $\dfrac{a}{b + c}$

11. Simplify each expression if $x = -\frac{2}{3}$ and $y = \frac{3}{4}$.

(a) $\dfrac{-2x + 4y}{x + y}$

(b) $\dfrac{x^2 + 2xy + y^2}{x + y}$

(c) $\dfrac{x^2 - y^2}{x - y}$

(d) $\frac{5x}{4y} + \frac{3x}{2y}$

12 Simplify.

(a) $4x + 5x - 6x$ (b) $3a - 7a + 12a$

(c) $4c + 7c - 15c$ (d) $6x^2 - 8x^2 + 3x^2$

(e) $5xy + 7xy + 9xy$

(f) $2a + 6b - 5a - 3b$

(g) $3c + 8m - 10m + 5c$

(h) $6x^2 - 3x - 8x^2 + 2x$

(i) $4x^2 - 5x^3 + 7x^2$

(j) $6x + 5 + 7x - 9$

(k) $5 - 7x + 6y - 8x + 2 - 8y$

13 Simplify.

(a) $(4x - 5y) + (6x + 3) - (7x - 2y)$

(b) $(4x + 9y) - (5x - 7y) + (2x + 5y)$

(c) $(2a - 8ab) - (7b + 9a) + (ab - 2a + 6b)$

(d) $(9x^2 + 2x + 2y) + (-5y - 6x^2 - 7x) - (5x^2 - 2x + 4y)$

14 Simplify.

(a) $(2x - 5) + (8x + 13)$

(b) $(3x + 8y) - (5x - 7y)$

(c) $(5a - 7ab) + (6b + 4a) - (9ab - 3a + 3b)$

(d) $3(3x - 8) - 4(8x + 1)$

15 Find the root of each equation.

(a) $3(n + 4) = 5n$

(b) $3x - 10 = 2(x - 3)$

(c) $2(x - 2) = 2(3 - x)$

(d) $4(c - 2) = 3(c + 1)$

(e) $8(m - 1) = 4(m + 4)$

(f) $4(3 - r) = 5(2r + 1)$

(g) $12(2m - 3) = 2(m + 4)$

(h) $0.5(x + 2) = 0.1x + 0.6(x - 3)$

16 Solve.

(g) $\frac{4}{5}x - 3 = 5$ (h) $7 = 1 + \frac{2}{3}x$

(i) $7 + \frac{1}{2}y = 10$ (j) $\frac{1}{3}b - 2 = 2$

(k) $16 = 10 + \frac{3}{5}x$

(l) $-5 + \frac{1}{4}x = -7$

17 Solve.

(a) $2y + \frac{1}{2} = \frac{2}{3}$

(b) $\frac{7}{6}x - 2 = \frac{1}{3}$

(c) $\frac{n}{4} - 1 = \frac{n}{5}$

(d) $3 - \frac{m}{2} = 5 - \frac{m}{3}$

(e) $\frac{2}{3}y - 3 = \frac{4}{5}y - 5$

(f) $\frac{3}{5}x - 2 = \frac{2}{3}x + 3$

(g) $\frac{x}{8} - \frac{3}{2} = -\frac{1}{40}$

(h) $\frac{1}{2}x + \frac{1}{3}x = 10$

18 Express each equation in the form $y = mx + b$.

(a) $3y = 6x + 9$

(b) $2x - 4y = 8$

(c) $3x + 6y - 12 = 0$

19 Determine the x- and y-intercepts of each equation.

(a) $x + y = 10$

(b) $2x + 4y = 16$

(c) $5x - 7y = 35$

(d) $9x = 54 - 6y$

20 Graph each equation by determining the intercepts.

(a) $x + y = 4$ (b) $x - y = 3$

(c) $2x + y = 6$ (d) $-x + 4y = 8$

21 Graph each equation using the slope and y-intercept.

(a) $y = 2x + 3$ (e) $2x + 5y = 10$

(c) $y = \frac{2}{3}x + 1$

22 Determine the slope of the line that passes through each pair of points.

(a) (5, 2) and (−1, 8)

(b) (−8, 1) and (−9, 2)

(c) (3, 7) and (−5, −9)

(d) (−4, 0) and (4, 6)

23 Write, in the form $y = mx + b$, the equation of the line that has

(a) a slope of 2 and a y-intercept of 8

(b) a slope of $\frac{3}{4}$ and a y-intercept of −6

(c) a slope of 6 and passes through (1, 5)

Review Answers:

1a) $6+(-3)$
$6+-3$
$=3$

i) $15+(-18)$
$=-3$

g) $(-3)+(-16)-10$
$=-29$

2c) $(-3)(5)(-4)$
$=+60$

f) $(-72)\div(-9)$
$=8$

i) $(5)(-9)\div(-3)(7)$
$-45\div-21$
$=\frac{45}{21}$

3b) $(-3)^2-(-2)^2$
$=9-4$
$=5$

f) $(-16)-((-8)\div 2)$
$(-16)-(-4)$
$-16+4$
$=-12$

4c) $\frac{(-16+4)\div 2}{8\div(-8)+4}$
$=\frac{(-12)\div 2}{-1+4}$
$=\frac{-6}{3}$
$=-2$

e) $-9-3[2(2-3)]$
$-9-3[2(-1)]$
$-9-3[-2]$
$-9+6$
-3

g) $160\div(-4)+2[3(8-4)]$
$-40+2[3(4)]$
$-40+2[12]$
$-40+24$
-16

5a) $\frac{1}{4}+\frac{-3}{4}=\frac{-2}{4}$
$=-\frac{1}{2}$

d) $\frac{-3}{5}+\frac{3}{-4}$
$\frac{-12}{20}+\frac{15}{-20}=-\frac{27}{20}$

i) $\frac{-3}{5}+\frac{-3}{4}-\frac{7}{10}$
$\frac{-12}{20}+\frac{-15}{20}-\frac{14}{20}$
$-\frac{41}{20}$

6a) $\frac{4}{5}\times\frac{-20}{25}=\frac{-80}{125}$
$=-\frac{16}{25}$

d) $(\frac{9}{4})(\frac{-2}{-3})$
$=\frac{-18}{-12}=\frac{-3}{-2}$

e) $(\frac{1}{-2})(\frac{-2}{5})=\frac{-2}{-10}$
$=+\frac{1}{5}$

j) $-4\frac{1}{6}\times-7\frac{3}{4}$
$-\frac{25}{6}\times-\frac{31}{4}=+\frac{775}{24}$

7a) $\frac{-4}{3}\div\frac{2}{-3}$
$-\frac{4}{3}\times\frac{-3}{2}=\frac{12}{6}$
$=2$

b) $-7\frac{1}{8}\div\frac{3}{2}$
$-\frac{57}{8}\times\frac{2}{3}=-\frac{114}{24}$
$=-\frac{19}{4}$

e) $\frac{-6}{1}\div(\frac{-4}{5})$
$-\frac{6}{1}\times\frac{5}{-4}=+\frac{30}{4}$
$=+\frac{15}{2}$

j) $(-1\frac{5}{8})\div 13$
$-\frac{13}{8}\times\frac{1}{13}$
$=-\frac{13}{104}=-\frac{1}{8}$

8 a) $-x+2y$

$-(-5)+2(-4)$

$5+(-8)$

$=-3$

f) $2xy-y^3$

$2(-5)(-4)-(-4)^3$

$40-(-64)$

$=104$

i) $(3(-5))^3+(2(-4))^2$

$(-15)^3+(-8)^2$

$-3375+64$

$=-3311$

9 a) $x+y$

$-\frac{1}{2}+\frac{2}{3}$

$-\frac{3}{6}+\frac{4}{6}$

$=\frac{1}{6}$

c) $x+2y$

$-\frac{1}{2}+2\left(\frac{2}{3}\right)$

$-\frac{1}{2}+\frac{4}{3}$

$-\frac{3}{6}+\frac{8}{6}$

$=\frac{5}{6}$

e) $\frac{1}{2}\left(-\frac{1}{2}\right)-\frac{1}{2}\left(\frac{2}{3}\right)$

$-\frac{1}{4}-\frac{2}{6}$

$-\frac{3}{12}-\frac{4}{12}$

$=-\frac{7}{12}$

10 a) $ab+c$

$\left(\frac{1}{3}\right)\left(\frac{1}{2}\right)+\left(-\frac{1}{8}\right)$

$\frac{1}{6}+\left(-\frac{1}{8}\right)$

$=\frac{4}{24}+\left(-\frac{3}{24}\right)$

$=\frac{1}{24}$

b) $2a-4b+c$

$2\left(\frac{1}{3}\right)-4\left(\frac{1}{2}\right)+\left(-\frac{1}{8}\right)$

$\frac{2}{3}-\frac{4}{2}-\frac{1}{8}$

$\frac{16}{24}-\frac{48}{24}-\frac{3}{24}$

$=-\frac{35}{24}$

c) $-\frac{1}{8}\left(\frac{1}{3}+\frac{1}{2}\right)$

$-\frac{1}{8}\left(\frac{2}{6}+\frac{3}{6}\right)$

$-\frac{1}{8}\left(\frac{5}{6}\right)$

$-\frac{5}{48}$

d) $\frac{a}{b+c}$

$\frac{\frac{1}{3}}{\frac{1}{2}-\frac{1}{8}} \rightarrow \frac{\frac{1}{3}}{\frac{4}{8}-\frac{1}{8}} \rightarrow \frac{\frac{1}{3}}{\frac{3}{8}}$

$\frac{1}{3}\times\frac{8}{3}=\frac{8}{9}$

11 a) $\frac{-2x+4y}{x+y}$

$x=-\frac{2}{3}$

$y=\frac{3}{4}$

$\frac{-2\left(-\frac{2}{3}\right)+4\left(\frac{3}{4}\right)}{-\frac{2}{3}+\frac{3}{4}}$

$\frac{\frac{4}{3}+\frac{12}{4}}{-\frac{8}{12}+\frac{9}{12}}$

$\rightarrow \frac{\frac{16}{12}+\frac{36}{12}}{\frac{1}{12}}$

$\frac{52}{12}\times\frac{12}{1}=\frac{624}{12}$

$=52$

p22. Nelson

12 a) $4x + 5x - 6x$
$= 3x$

i) $4x^2 - 5x^3 + 7x^2$
$= -5x^3 + 11x^2$

k) $5 - 7x + 6y - 8x + 2 - 8y$
$= -15x - 2y + 7$

13 a) $(4x - 5y) + (6x + 3) - (7x - 2y)$
$= 4x - 5y + 6x + 3 - 7x + 2y$

$= 4x + 6x - 7x - 5y + 2y + 3$
$= 3x - 3y + 3$

b) $(4x + 9y) - (5x - 7y) + (2x + 5y)$
$= 4x + 9y - 5x + 7y + 2x + 5y$
$= x + 21y$

c) $(2a - 8ab) - (7b + 9a) + (ab - 2a + 6b)$
$= 2a - 8ab - 7b - 9a + ab - 2a + 6b$
$= 2a - 9a - 2a - 8ab + ab - 7b + 6b$
$= -9a - 7ab - b$

d) $(9x^2 + 2x + 2y) + (-5y - 6x^2 - 7x) - (5x^2 - 2x + 4y)$
$= 9x^2 + 2x + 2y - 5y - 6x^2 - 7x - 5x^2 + 2x - 4y$
$= 9x^2 - 6x^2 - 5x^2 + 2x - 7x + 2x + 2y - 5y - 4y$
$= -2x^2 - 3x - 7y$

#14 a) $(2x - 5) + (8x + 13)$
$= 2x - 5 + 8x + 13$
$= 10x + 8$

b) $(3x + 8y) - (5x - 7y)$
$= 3x + 8y - 5x + 7y$
$= -2x + 15y$

c) $(5a - 7ab) + (6b + 4a) - (9ab - 3a + 3b)$
$= 5a - 7ab + 6b + 4a - 9ab + 3a - 3b$
$= 5a + 4a + 3a - 7ab - 9ab + 6b - 3b$
$= 12a - 16ab + 3b$

d) $3(3x - 8) - 4(8x + 1)$
$= 9x - 24 - 32x - 4$
$= 9x - 32x - 24 - 4$
$= -23x - 28$

h) $(3d^3-6+5d^2)+4(9-2d^3-4d^2)$
$=3d^3-6+5d^2+36-8d^3-16d^2$
$=3d^3-8d^3+5d^2-16d^2-6+36$
$=-5d^3-11d^2+30$

p24 15a) $3(n+4)=5n$
$3n+12=5n$
$3n-5n=-12$
$\frac{-2n}{-2}=\frac{-12}{-2}$
$n=6$

e) $8(m-1)=4(m+4)$
$=8m-8=4m+16$
$=8m-4m=16+8$
$\frac{4m}{4}=\frac{24}{4}$
$m=6$

g) $12(2m-3)=2(m+4)$
$24m-36=2m+8$
$24m-2m=8+36$
$\frac{22m}{22}=\frac{44}{22}$
$m=2$

h) $0.5(x+2)=0.1x+0.6(x-3)$
$0.5x+1=0.1x+0.6x-1.8$
$0.5x-0.1x-0.6x=-1.8-1$
$\frac{-0.2x}{-0.2}=\frac{-2.8}{-0.2}$
$x=14$

#16 g) $\frac{4}{5}x-3=5$
$\frac{4}{5}x=8$
$\frac{4x}{4}=\frac{40}{4}$
$x=10$

k) $16=10+\frac{3}{5}x$
$6=\frac{3}{5}x$
$\frac{30}{3}=\frac{3x}{3}$
$x=10$

l) $-5+\frac{1}{4}x=-7$
$\frac{1}{4}x=-2$
$x=-8$

#17 a) $2y+\frac{1}{2}=\frac{2}{3}$
$2y=\frac{2}{3}-\frac{1}{2}$
$2y=\frac{4}{6}-\frac{3}{6}$
$2y=\frac{1}{6}$
$y=\frac{1}{6}\div 2$
$y=\frac{1}{6}\times\frac{1}{2}$
$y=\frac{1}{12}$

d) $3-\frac{m}{2}=5-\frac{m}{3}$
$\frac{m}{3}-\frac{m}{2}=5-3$
$\frac{2m}{6}-\frac{3m}{6}=2$
$-\frac{1}{6}m=2$
$m=-12$

h) $\frac{1}{2}x+\frac{1}{3}x=10$
$\frac{3}{6}x+\frac{2}{6}x=10$
$\frac{5}{6}x=10$
$\frac{5x}{5}=\frac{60}{5}$
$x=12$

p26

18 a) $3y = 6x + 9$

$y = 2x + 3$

c) $3x + 6y - 12 = 0$

$6y = -3x + 12$

$y = -\frac{1}{2}x + 2$

h) $5x - 10 = -3y$

$3y = -5x + 10$

$y = -\frac{5}{3}x + \frac{10}{3}$

b) $2x - 4y = 8$

$\frac{-4y}{-4} = \frac{-2x}{-4} + \frac{8}{-4}$

$y = \frac{1}{2}x - 2$

19 b) $2x + 4y = 16$

Let $x = 0$: $\frac{4y}{4} = \frac{16}{4}$, $y = 4$

Let $y = 0$: $\frac{2x}{2} = \frac{16}{2}$, $x = 8$

$(0, 4)$ $(8, 0)$

d) $9x = 54 - 6y$

Let $x = 0$: $\frac{6y}{6} = \frac{54}{6}$, $y = 9$

Let $y = 0$: $\frac{9x}{9} = \frac{54}{9}$, $x = 6$

$(0, 9)$ $(6, 0)$

20 c) $2x + y = 6$

Let $x = 0$: $y = 6$, $(0, 6)$

Let $y = 0$: $\frac{2x}{2} = \frac{6}{2}$, $x = 3$, $(3, 0)$

f) $3x - 4y = 12$

Let $x = 0$: $-4y = 12$, $y = -3$, $(0, -3)$

Let $y = 0$: $\frac{3x}{3} = \frac{12}{3}$, $x = 4$, $(4, 0)$

21 a) $y = 2x + 3$

slope $= 2$

y-intercept $= 3$ $(0, 3)$

e) $2y = x + 6$

$y = \frac{1}{2}x + 3$

$m = \frac{1}{2}$

y-intercept $= 3$ $(0, 3)$

p28

22 a) $m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$

$= \frac{-1-2}{8-5}$

$= \frac{-3}{3}$

$= -1$

c) $m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$

$= \frac{-9-7}{-5-3}$

$= \frac{-16}{-8}$

$= 2$

23. a) $y = 2x + 8$

c) $y = mx + b$

$y = 6x + b$

$5 = 6(1) + b$

$5 - 6 = b$

$b = -1$

$y = 6x - 1$

3a) $Ax + By + C = 0$

$3x + y - 10 = 0$

d) $2x - 3y - 5 = 0$

Not included

5a) $m_1 = 5$, $m_2 = \frac{1}{5}$ neither

b) $m_1 = -3$, $m_2 = \frac{1}{3}$ perpendicular = straight line at right angles to another line

c) $m_1 = \frac{3}{4}$, $m_2 = 0.75$ parallel

d) $m_1 = -0.6$, $m_2 = \frac{3}{5}$ neither

e) $m_1 = \frac{4}{7}$, $m_2 = -\frac{7}{4}$ perpendicular

Not included